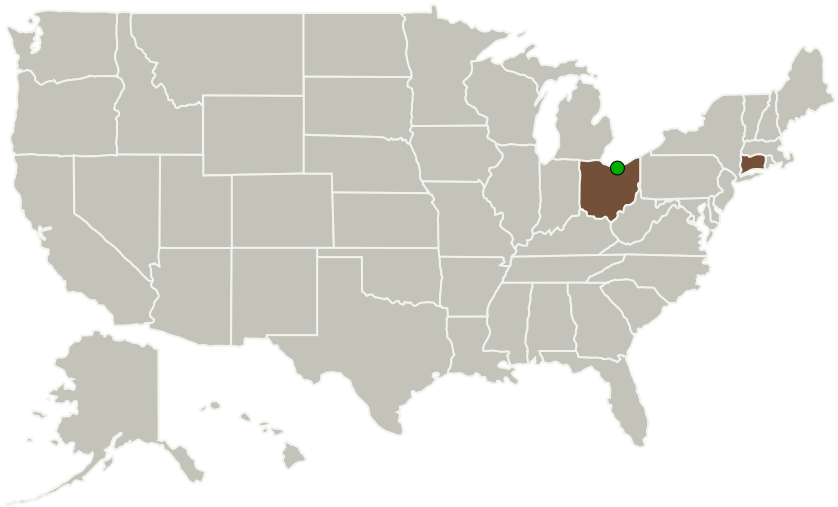
Distributed Engine Control Empirical/Analytical Verification Tools, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

In this Phase I project, Impact Technologies, in collaboration with Prof. R.K. Yedavalli, propose a novel verification environment for eventual rapid certification of distributed engine control systems (DCS). Our approach is focused on providing a set of tools to the government and industry that will allow faster certification of the control system as new high-temperature components and control laws are developed. A distributed hardware-in-the-loop (D-HIL) simulation tool is proposed to assist NASA and the Distributed Engine Control Working Group (DECWG) to integrate DCS components onto existing and next-generation engines. The proposed D-HIL simulator consist of a thermal test chamber operated by an engine simulation which is capable of subjecting components to a range of possible transient thermal conditions seen during engine operation , while functioning as elements in the networked control loop. To aid in certification of more complex distributed engine control hardware and software, a set of analysis tools is proposed. The Global Verification Toolset makes use of global stability and bounded verification methodologies to allow stability and performance to be assessed in a systematic fashion. At the conclusion of Phase I, the new verification facility and software tools will be demonstrated in a system test using the C-MAPSS engine.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Sikorsky Aircraft Corporation	Lead Organization	Industry	Stratford, Connecticut
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Connecticut	Ohio

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138101)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Sikorsky Aircraft Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

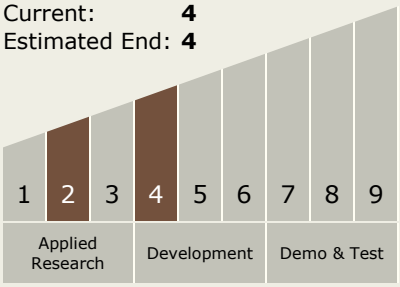
Carlos Torrez

Principal Investigator:

Jonathan A Decastro

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.2 Earth Storable

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System